AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1 – 108. (canceled).

109. (previously presented) Method for making fused silica products, comprising

providing a chamber,

providing plural parallel substrates positioned in the chamber,

providing a support,

providing first movers on the support,

connecting the first movers to the substrates,

moving the substrates with respect to each other,

providing a second mover connected to a support for the first movers for moving the first movers with respect to the chamber,

disposing silica particle providers in the chamber providing silica particles which deposit on the substrates,

providing heaters in the chamber,

heating the substrates and the particles,

softening and agglomerating surfaces of the particles and sticking the particles on the substrates and on particles stuck to the substrates and creating preforms of the particles on the substrates.

110. (previously presented) The method of claim 109, wherein providing the substrates comprises providing long hollow tubular substrates, and wherein the first movers and second mover rotate the long hollow tubular substrates within the chamber.

111. (previously presented) The method of claim 110, wherein providing the heaters further comprise providing a heater within the hollow tubular substrates and heating the substrates from within.

112. (original) The method of claim 110, further comprising connecting valved purged gas and dopant gas to the hollow tubular substrates.

113. (original) The method of claim 109, further comprising connecting valved vacuum, dopant gas and purge gas ports to the chamber.

114. (original) The method of claim 109, wherein providing the silica particle providers comprises providing burners mounted near walls of the chamber and pyrolyzing silicon compositions and generating silica powder.

115. (original) The method of claim 109, wherein providing the silica particle providers comprises providing silica powder injectors near walls of the chamber.

116. (original) The method of claim 109, wherein providing the second movers further comprise providing rotation and translation mechanisms connected to the support and rotating and translating the substrates in the chamber.

117. (previously presented) The method of claim 116, wherein providing the first mover further comprises providing independent adjustment and support mechanisms connected to the support which is connected to rotation and translation mechanisms, and further comprising providing plural adjusters connected to independent rotation and support mechanisms and moving the plural substrates and rotating them with respect to each other as the rotation and support mechanisms rotate and translate the substrates within the chamber.

118. (original) The method of claim 109, further comprising providing heat controls connected to the heaters and increasing temperature within the chamber to vitrification temperatures and vitrifying and densifying the preforms in the chamber.

119. (original) The method of claim 109, wherein the chamber, the at least one substrate and the preform are vertically oriented, and wherein the particle providers provide particles from cylindrical side areas of the chamber.

120. (previously presented) The method of claim 119, wherein the chamber is a preform forming chamber further comprising the providing a preform melting chamber below the preform forming chamber, and providing a movable shelf separating the preform forming chamber and the preform melting chamber, providing heaters adjacent walls of the preform melting chamber and providing valved ports connected to the preform melting chamber for providing gas delivery, gas venting, vacuum and dopants, and providing multiple heating zones in the chambers, and further comprising providing a rotating and pulling assembly connected to the preform melting chamber and withdrawing a fused silica member from the preform chamber.

121. (original) The method of claim 120, further comprising providing a plasma surface removal unit positioned below the rotating and pulling assembly and finishing a surface of the fused silica member.

122. (original) The method of claim 120, further comprising providing a plate and bar forming chamber, providing an input connected to the rotating and pulling assembly and withdrawing the fused silica member directly into the plate and bar forming chamber.

123 – 127. (canceled).

128. (previously presented) A method of producing fused silica fiber optic preforms, comprising:

providing a chamber,

providing a plurality of substrates within the chamber,

relatively rotating the plurality of substrates with respect to each other in the chamber,

heating the chamber and the substrates,

feeding silica particles into the chamber toward the substrates,

fusing silica particles on the substrates,

sticking particles to particles held on the substrates and forming porous silica preforms on the substrates, and

relatively moving the substrates and preforms in the chamber.

129. (previously presented) The method of claim 128, wherein the feeding of silica particles comprises generating silica particles with pyrolysis of silica particle precursors from wall-mounted burners.

130. (previously presented) The method of claim 128, wherein the feeding of silica particles further comprises feeding silica particle streams toward the substrate and preform.

131. (original) The method of claim 130, further comprising

providing dopant gases to the chamber and through the substrate, and

providing purge gas to the chamber and through the substrate, and

venting and removing gases from the chamber.

132. (original) The method of claim 128, wherein the moving comprises relatively rotating and translating the substrates and preforms within the chamber.

133. (previously presented) The method of claim 128, further comprising

stopping the feeding of silica particles,
increasing heat on the preforms, and
densifying and vitrifying the preforms.

134. (original) The method of claim 133, further comprising
depositing second layers of fused silica on the densified and vitrified silica preforms.

135. (original) The method of claim 128, further comprising
providing doped or undoped silica cores on the substrates and
depositing doped or undoped cladding layers on the silica cores.

136 - 240. (canceled).

241. (previously presented) The method of claim 128, wherein the heating includes heating the substrates to a certain temperature and maintaining the temperature for a certain time interval.

242. (previously presented) The method of claim 128, wherein the heating is accomplished via at least one of resistive heating and RF coil heating.

243. (previously presented) The method of claim 128, wherein the heating is accomplished via a heating element located within at least one of the substrates.

244. (previously presented) The method of claim 128, wherein feeding silica particles occurs subsequent to the heating of the chamber and substrates.

245. (previously presented) The method of claim 128, wherein at least one of the substrates includes a hemispherical end portion.

246. (previously presented) The method of claim 128, further comprising:

providing a pulling mechanism adjacent at least one of the substrates.

247. (previously presented) The method of claim 128, wherein providing a chamber includes providing a plurality of chambers and separately controlling heating in each of the plurality of chambers.

248. (previously presented) The method of claim 128, wherein providing a chamber includes providing a plurality of chambers and separately controlling pressure in each of the plurality of chambers.

249. (previously presented) The method of claim 128, wherein providing a chamber includes providing a plurality of chambers and separately controlling dopant quantity in each of the plurality of chambers.

250. (previously presented) The method of claim 128, further comprising:

providing an electric field generator adjacent at least one of the substrates.

251. (Currently Amended) A method of producing fused silica fiber optic preforms, comprising

providing a chamber configured to provide a controllable environment separate from an exterior ambient room environment,

controlling at least one of temperature and dopant quantity within the chamber;

controlling pressure within the chamber;

providing at least one substrate within the chamber,

relatively rotating the at least one substrate in the chamber,

heating the chamber and the at least one substrate,

feeding silica particles into the chamber,

fusing silica particles on the at least one substrate,

sticking particles to particles held on the at least one substrate and forming a porous silica preform on the at least one substrate, ~~and~~

moving the at least one substrate and preform in the chamber**, and**

providing a plurality of substrates, wherein the moving comprises relatively rotating and translating the plurality of substrates and preforms within the chamber.

252. (previously presented) The method of claim 251, wherein the feeding of silica particles comprises generating silica particles with pyrolysis of silica particle precursors from wall-mounted burners.

253. (previously presented) The method of claim 251, wherein the feeding of silica particles further comprises feeding silica particle streams toward the at least one substrate and preform.

254. (previously presented) The method of claim 253, further comprising:
providing dopant gases to the chamber and the at least one substrate,
providing purge gas to the chamber and the at least one substrate, and
venting and removing gases from the chamber.

255. (canceled)

256. (canceled)

257. (previously presented) The method of claim 251, further comprising
stopping the feeding of silica particles,
increasing heat on the preform, and
densifying and vitrifying the preform.

258. (previously presented) The method of claim 257, further comprising

depositing second layers of fused silica on the densified and vitrified silica preform.

259. (previously presented) The method of claim 251, further comprising

providing a doped or undoped silica core on the at least one substrate and depositing doped or undoped cladding layers on the silica core.

260. (previously presented) The method of claim 251, wherein the controlling of temperature includes heating the at least one substrate such that the substrate is at a uniform temperature throughout.

261. (previously presented) The method of claim 251, wherein the controlling of temperature is accomplished via at least one of resistive heating and RF coil heating.

262. (previously presented) The method of claim 251, wherein the controlling of temperature is accomplished via a heating element located within the at least one substrate.

263. (previously presented) The method of claim 251, wherein feeding silica particles occurs subsequent to the heating of the chamber and the at least one substrate.

264. (previously presented) The method of claim 251, wherein the at least one substrate includes a hemispherical end portion.

265. (previously presented) The method of claim 251, further comprising:

providing a pulling mechanism adjacent the at least one substrate.

266. (previously presented) The method of claim 251, wherein providing a chamber includes providing a plurality of chambers and separately controlling heating in each of the plurality of chambers.

267. (previously presented) The method of claim 251, wherein providing a chamber includes providing a plurality of chambers and separately controlling pressure in each of the plurality of chambers.

268. (previously presented) The method of claim 251, wherein providing a chamber includes providing a plurality of chambers and separately controlling dopant quantity in each of the plurality of chambers.

269. (previously presented) The method of claim 251, further comprising:
providing an electric field generator adjacent the at least one substrate.

270. (previously presented) The method of claim 251, further comprising:
forming the preform as a doped or undoped solid body.

271. (previously presented) The method of claim 270, further comprising:
depositing doped or undoped silica on the solid body.

272. (previously presented) The method of claim 128, further comprising:
forming the preforms into doped or undoped solid bodies.

273. (previously presented) The method of claim 272, further comprising:
depositing doped or undoped silica on the solid bodies.

274. (previously presented) The method of claim 109, further comprising:
forming the preforms as doped or undoped solid bodies.

275. (previously presented) The method of claim 274, further comprising:
depositing doped or undoped silica on the solid bodies.

276. (previously presented) The method of claim 128, wherein relatively moving includes relatively moving the preforms and substrate with respect to the chamber.

277. (previously presented) The method of claim 128, further comprising:
directing silica particle streams toward the substrates and preforms.

278. (previously presented) The method of claim 128, further comprising:
feeding dopant gases into the chamber and to at least one of the substrates,
feeding purge gas to the chamber and to at least one of the substrates, and
venting and removing gases from the chamber.

279. (previously presented) The method of claim 128, further comprising:
providing a doped or undoped silica core on at least one of the substrates for depositing a doped or undoped cladding layer on the silica core.

280. (previously presented) The method of claim 251, wherein feeding silica particles includes feeding the silica particles from a silica stream generator located adjacent a wall of the chamber.

281. (original) The method of claim 251, wherein controlling pressure includes maintaining a substantial vacuum within the chamber.